

*What Every Member of the
Trade Community Should Know About:*

Soldering and Welding Machines and Apparatus



An Informed Compliance Publication

Revised April 2001

U.S. CUSTOMS

NOTICE:

This publication is intended to provide guidance and information to the trade community. It reflects the Customs Service's position on or interpretation of the applicable laws or regulations as of the date of publication, which is shown on the front cover. It does not in any way replace or supersede those laws or regulations. Only the latest official version of the laws or regulations is authoritative.

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PREFACE

On December 8, 1993, Title VI of the North American Free Trade Agreement Implementation Act (Pub. L. 103-182, 107 Stat. 2057), also known as the Customs Modernization or “Mod” Act, became effective. These provisions amended many sections of the Tariff Act of 1930 and related laws.

Two new concepts that emerge from the Mod Act are “***informed compliance***” and “***shared responsibility***,” which are premised on the idea that in order to maximize voluntary compliance with Customs laws and regulations, the trade community needs to be clearly and completely informed of its legal obligations. Accordingly, the Mod Act imposes a greater obligation on Customs to provide the public with improved information concerning the trade community's rights and responsibilities under the Customs and related laws. In addition, both the trade and Customs share responsibility for carrying out these requirements. For example, under Section 484 of the Tariff Act as amended (19 U.S.C. §1484), the importer of record is responsible for using reasonable care to enter, classify and determine the value of imported merchandise and to provide any other information necessary to enable Customs to properly assess duties, collect accurate statistics, and determine whether other applicable legal requirements, if any, have been met. The Customs Service is then responsible for fixing the final classification and value of the merchandise. An importer of record's failure to exercise reasonable care could delay release of the merchandise and, in some cases, could result in the imposition of penalties.

The Office of Regulations and Rulings has been given a major role in meeting Customs informed compliance responsibilities. In order to provide information to the public, Customs has issued a series of informed compliance publications, and videos, on new or revised Customs requirements, regulations or procedures, and a variety of classification and valuation issues.

The National Commodity Specialist Division of the Office of Regulations and Rulings has prepared this publication on ***Soldering and Welding Machines and Apparatus*** as part of a series of informed compliance publications regarding the classification and origin of imported merchandise. We sincerely hope that this material, together with seminars and increased access to Customs rulings, will help the trade community to improve, as smoothly as possible, voluntary compliance with Customs laws.

The material in this publication is provided for general information purposes only. Because many complicated factors can be involved in customs issues, an importer may wish to obtain a ruling under Customs Regulations, 19 CFR Part 177, or to obtain advice from an expert who specializes in customs matters, for example, a licensed customs broker, attorney or consultant. Reliance solely on the information in this pamphlet may not be considered reasonable care.

Comments and suggestions are welcomed and should be addressed to the Assistant Commissioner at the Office of Regulations and Rulings, U.S. Customs Service, 1300 Pennsylvania Avenue, NW, Washington, D.C. 20229.

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Introduction

When goods are imported into the Customs Territory of the United States (the fifty states, the District of Columbia and Puerto Rico), they are subject to certain formalities involving the U.S. Customs Service. In almost all cases, the goods are required to be “entered,” that is, declared to the Customs Service, and are subject to detention and examination by Customs officers to insure compliance with all laws and regulations enforced or administered by the United States Customs Service. As part of the entry process, goods must be “classified” (determined where in the U.S. tariff system they fall) and their value must be determined. Pursuant to the Customs Modernization Act, it is now the responsibility of the importer of record to use “reasonable care” to “enter,” “classify” and “value” the goods and provide any other information necessary to enable the Customs Service to properly assess duties, collect accurate statistics, and determine whether all other applicable legal requirements are met.

Classifying goods is important not only for duty purposes, but also to determine whether the goods are subject to quotas, restraints, embargoes or other restrictions. The act of classifying goods is complex and requires an importer to be familiar with the *Harmonized Tariff Schedule of the United States* (HTSUS), its 99 chapters, rules of interpretation, and notes. A detailed discussion of the HTSUS may be found in a companion publication entitled, *What Every Member of the Trade Community Should Know About: Tariff Classification*. Customs valuation requirements are separately discussed in a companion publication entitled, *What Every Member of the Trade Community Should Know About: Customs Value*. Both of these publications are available from the Customs World Wide Web pages on the Internet (see the Additional Information section for information on accessing these sources and obtaining additional Customs Service publications).

Classification of merchandise under the Harmonized Tariff Schedule of the United States is in accordance with the General Rules of Interpretation (GRI's). GRI 1 provides that classification shall be determined according to the terms of the headings and any relative section or chapter notes.

The *Harmonized Commodity Description and Coding System Explanatory Notes* (referred to as E.N. or *Explanatory Notes*)¹ constitute the official interpretation of the Harmonized System at the international level. While not legally binding nor dispositive, the E.N.s provide a commentary on the scope of each heading of the Harmonized System and are generally indicative of the proper interpretation of these headings. See T.D. 89-80, 54 FR 35127, 35128 (August 23, 1989).

¹ The *Harmonized Commodity Description and Coding System Explanatory Notes* - Second Edition is © 1996 Customs Co-operation Council (working name: World Customs Organization (WCO)), Rue du Marché 30, B-1210 Brussels, Belgium.

Imports of SOLDERING, BRAZING and WELDING machines and apparatus and parts thereof under headings 8468 and 8515 have been under close scrutiny in recent fiscal years. Many classification errors have been found during the course of this review. The purpose of this publication is to provide classification guidance to eliminate these errors in the future.

Some products will be covered in more detail than others. Much of the information about what products are actually being imported comes from reports received from Import Specialists at the various Customs ports. Based on their submission of invoices, product literature, catalogs and in some instances, samples, as well as their comments, we know where the problems lie. Products that have not been reported include the gas operated surface tempering machines of heading 8468 and the electric machines and apparatus for hot spraying of metals or cermets of heading 8515. There have been only two reports on brazing machines and apparatus in the last five years. These products do not have their own separate subheadings. Since they are included in subheadings for "other machinery and apparatus" they cannot be identified by import statistics.

How does the industry define soldering, brazing and welding?

The *Welding Handbook, Eighth Edition*, published by the American Welding Society (AWS), provides the following definitions:

Soldering is defined as a group of joining processes that produce coalescence of materials by heating them to the soldering temperature and by using a filler metal (solder) having a liquidus not exceeding 840 degrees F (450 degrees C) and below the solidus of the base metals. The solder is distributed between closely fitted faying surfaces of the joint by capillary action. (Faying surface is that mating surface of a member that is in contact with or in close proximity to another member to which it is to be joined.)

Brazing joins materials by heating them in the presence of a filler metal having a liquidus above 840 degrees F (450 degrees C) but below the solidus of the base metals.

Welding is a joining process that produces coalescence of materials by heating to welding temperature with or without application of pressure or by application of pressure alone and with or without the use of filler metal.

In addition to these general definitions, the definitions of specific processes (e.g., flux cored arc welding,) appearing further on in this report are all taken from *the Welding Handbook* and the ASW publication A3.0-94, *Standard Welding Terms and Definitions*.

Soldering, brazing and welding machinery and apparatus are provided for in the Harmonized Tariff Schedule of the United States (HTSUS) under headings 8468 and 8515. Both headings include such machinery and apparatus whether or not capable of cutting however both exclude equipment designed exclusively for cutting. Neither

heading includes accessories. The most basic distinction between the headings is that heading 8468 covers non-electrical while heading 8515 covers electrical.

There is a significant change from the classification of this equipment under the previous tariff, the Tariff Schedules of the United States Annotated (TSUSA). Under TSUSA, welding etc. was limited to metals. Under HTSUS, there is no such limitation under either heading 8468 or heading 8515. The Explanatory Notes to both headings describe thermoplastic welding apparatus.

Section and Chapter Notes

Before proceeding to discuss these headings, it is necessary to examine the relevant section and chapter notes and to read the General Rules of Interpretation (GRI's) and the Additional U.S. Rules of Interpretation. GRI 1 provides that for legal purposes, classification shall be determined according to the terms of the headings (in this case, heading 8468 and heading 8515) and any relative section or chapter notes.

Both headings are found in section XVI. Notes 1 (a) through (p) of section XVI describe items **not** covered by the section. These items thus cannot be classified under chapter 84 which includes the non-electrical soldering, brazing and welding equipment or under chapter 85 which covers the electrical equipment.

Section XVI Notes

Although all the notes should be read, for the purposes of this publication, comments will be made only on those notes most likely to affect the classification of soldering, brazing and welding apparatus. For example, note 1(b) will not be discussed since it excludes articles of leather. (If there are any parts for welding machines made of leather, we are unaware of them.) Notes more relevant include:

Note 1(a) excludes transmission, conveyor or elevator belts or belting, of plastics of chapter 39, or of vulcanized rubber (heading 4010); or other articles of a kind used in machinery or mechanical or electrical appliances or for other technical uses, of vulcanized rubber other than hard rubber (heading 4016).

Note 1(c) excludes bobbins, spools, cops, cones, cores, reels or similar supports, of any material (for example, chapter 39, 40, 44 or 48 or section XV). Reels for welding wire have been erroneously entered as parts of welding machines and apparatus.

Note 1(e) excludes transmission or conveyor belts of textile material (heading 5910) or other article of textile material for technical uses (heading 5911).

Note 1(g) excludes parts of general use, as defined in note 2 to section XV, of base metal (section XV), or similar goods of plastics (chapter 39). This note refers to items such as nuts, bolts, screws, springs, tube or pipe fittings, chains, etc.

Note 1(k) excludes articles of chapter 82 or 83. For example, self-contained blow torches of subheading 8205.60 and coated electrodes of base metal, for electric arc-welding of heading 8311 are excluded.

Note 1(m) excludes articles of chapter 90. Items such as measuring instruments (various headings in chapter 90, depending on the type) and separately imported lasers (subheading 9013.20) would be excluded.

Parts

The rules for classifying parts are provided for in section XVI, note 2, subject, of course, to the exclusions already mentioned in section XVI, note 1.

Note 2(a) indicates that parts which are goods included in any of the headings of chapter 84 or chapter 85 are in all cases to be classified in their respective headings. The Explanatory Notes to Section XVI provide numerous examples of such parts and state that the classification applies even if the part is specially designed to work as part of a specific machine. Examples include:

- pumps - heading 8413
- lifting and handling machinery - heading 8428
- valves - heading 8481
- bearings - heading 8482
- gearboxes - heading 8483
- electric motors - heading 8501
- welding generators - heading 8502
- welding transformers - heading 8504
- welding control panels - heading 8537
- welding cables - heading 8544

Note also that a part of one of the above items which is in turn part of a welder will be classified as a part of that item, not as a part of the welder. For example, a part of a motor for a welding machine would be classified as a part of the motor, not as part of the welder, subject of course to any section or chapter notes or heading requirements for motors and parts thereof.

Note 2(b) states essentially that other parts, if suitable for use solely or principally with a particular kind of machine, or with a number of machines of the same heading are to be classified with the machines of that kind.

This means that a part of a welder, for example, that is not excluded by note 1 (such as a laser) or note 2(a) (such as a power supply) would be classified under subheading 8468.90 if part of a non-electric welder or under subheading 8515.90 if part of an electric welder.

As you can see, the note refers to other “parts” not “accessories” and the individual headings themselves, heading 8468 and heading 8515, do not include

accessories. (Some headings in chapter 84 do include accessories. For example, heading 8466 provides for parts and accessories suitable for use solely or principally with machine tools.) The distinction between “parts” and “accessories” can be difficult. Some items, such as electrode holders which are described as parts in the Explanatory Notes to heading 8515, are often described in welding catalogs as accessories.

An item is more likely to be classified as other parts under note 2(b) if it is essential to the operation of the machine or apparatus it is used with. Other factors to be considered include dedication to use with a particular individual machine or type of machine or apparatus. Can the item be used with any other type of machinery? Does the item participate in the operation of the machine? Or is it merely used offline.

The “essential” factor can be subject to interpretation. For example, many welding processes involve feeding in wire. Is the wire feeder essential? Theoretically, someone could stand by and manually feed wire into the weld pool. As a practical matter, the wire feeder is often essential to the efficient operation of the machine. For this reason, it is classified as parts. The electrode holder obviously participates in the process. It holds the electrode during the welding operation.

Many welding processes require the use of jigs and fixtures. The function of a fixture is to facilitate assembly of parts and to hold the parts in a fixed relationship during the weld. (In engineering, the terms jig and fixture have essentially the same meaning.)

Items not essential or dedicated are not likely to be classified as parts. A stand to hold the soldering iron when not in use is not essential to the soldering process. It does not hold the iron when in use. A solder tip cleaner, a device used to remove debris from the soldering tip, likewise does not participate in the soldering operation. These items are accessories.

In general, consumables are not classified as parts. Such items include but are not limited to consumable electrodes, welding wire, solder paste, gas for gas welding processes, etc.

If classification as parts is claimed, the importer may be asked to provide literature on the welding machine or apparatus that the item is said to be a part of and indicate where the part is, what its function is, etc.

At the end of this publication, a list of items related to welding is provided indicating which items are parts and which are classified elsewhere.

Spare Parts

What about spare parts? Example: A foreign manufacturer ships a welding machine with a few extra bearings, gears, valves, switches etc. because these items require replacement more frequently than other components.

Spare parts cannot be classified with the machine. They must be separately classified in accordance with the relevant section or chapter notes.

Invoicing

Example: The invoice from the manufacturer lists the basic machine followed by the specific options ordered as follows:

plasma arc welder model A
DC power source model B
control console model C

Are the power source and control separately classified? The invoice may or may not have unit values for each item listed.

As long as the invoiced items constitute one machine, they are classified under the appropriate heading for that machine. If it is not apparent from the invoice that it is a single machine (or more than one complete machine), Customs may question classification under a single tariff provision. It would be helpful if the invoice would state, for example, "plasma arc welder, including model B power source ... " etc.

Composite and Multifunction Machines

Section XVI, note 3 deals with composite machines - two or more machines fitted together to form a whole and other machines adapted to perform two or more complementary or alternative functions. Classification is to be determined as if consisting only of that component or as being that machine which performs the principal function.

The Explanatory Notes to Section XVI indicate that a machine is taken to be "fitted together to form a whole" when incorporated one in the other or mounted one on the other, or mounted on a common base or frame or in a common housing.

A combination welding and cutting machine mounted on a common base, for example, would be classified as a welding machine if welding is the principal function. If that composite welding/cutting machine which normally would incorporate a control unit were to be imported without the control, it would still be classified as a welding machine since GRI (General Rule of Interpretation) 2(a) indicates that any reference in a heading to an article shall be taken to include a reference to that article incomplete or unfinished, provided that, as entered, the incomplete or unfinished article has the essential character of the complete or finished article.

Functional Units

Section XVI, note 4 deals with the functional unit concept. Where a machine (including a combination of machines) consists of individual components (whether

separate or interconnected by piping, cables, etc.) intended to contribute together to a clearly defined function covered by one of the headings in chapter 84 or chapter 85, then the whole falls to be classified in the heading appropriate to that function.

GRI 2(a) however cannot be applied in the case of Note 4. There can be no “unfinished functional units”.

A common example of the functional unit in the welding industry is the robot with welding attachment connected to a control panel by electrical cables. The welding attachment, also known as “end of arm tooling”, may be a resistance welding package for spot welding or an arc welding package. The robot manipulates the welding torch as directed by the controller. In most instances, the robots and controls are imported without this tooling. In these instances, the robot and control unit must be separately classified since HQ has ruled that there can be no unfinished functional units. The control is classified under HTSUS subheading 8537.10 which provides for other bases for electric control or the distribution of electricity. The classification of the robot depends on whether it is a general purpose robot or whether it has any feature which dedicates it to performing a particular function such as welding, spraying, loading and unloading, etc. General purpose robots are classified in subheading 8479.50.00 as industrial robots not elsewhere specified or included. (See HQ ruling 962105 of April 22, 1999.)

Another example of a functional unit is a welded tube forming line classified under HTSUS subheading 8515.31. NY ruling 810478 of June 12, 1995 covered such a line consisting essentially of an uncoiler, strip leveler, endwelder, roll former, welding table, TIG and plasma welding unit, seam tracking system, spray cooling section, tube seam grinding unit, inside bead roller, roll out table, cutoff saw, tooling and controls.

Here we have handling devices, machine tools and welding equipment contributing to the production of a welded tube. The welded tube is steel strip formed into a cylinder and welded together. The line is sometimes referred to as a welded tube mill however it is not a rolling mill of heading 8455. Some importers have mistakenly entered this equipment under heading 8455.

In NY ruling 810478 it was stated that all of the equipment would be imported in one shipment. Machinery lines of this type are often imported in a number of shipments due to size considerations. The functional unit concept cannot be applied if there is more than one shipment. For classification purposes, each shipment stands on its own. In HQ ruling 958807 of April 30, 1996, it is stated that “It is well settled that merchandise must be classified and assessed duty in condition as imported. Components of a machine that arrive within the customs territory on different days cannot be aggregated for classification and appraisal purposes under a single HTSUS provision”.

A wire mesh making machine was classified under subheading 8515.21 in NY ruling B82366 of March 3, 1997. Another example of a functional unit, it consisted

essentially of an uncoiler, straightener, shear, positioner, welder, stacker and output conveyor.

Generally, any welding machine imported with a handling (loading, unloading, etc.) machine would be classified together as a functional unit under heading 8468 or heading 8515. The handling function of heading 8428 is always subsidiary.

Chapter Notes

In addition to these section notes, we have the notes for the chapters within section XVI.

Chapter 84 note 1(b) for example excludes ceramic articles. A ceramic part of a non-electric welder of heading 8468 must be classified under chapter 69. However, a ceramic part for an electric welder of heading 8515 (such as a ceramic nozzle) would be classified in subheading 8515.90 since chapter 85 does not have a note excluding ceramic articles.

Chapter 84, note 2 states that “subject to note 3 to section XVI, a machine or appliance which answers to a description in one or more of the headings 8401 to 8424 and at the same time to a description in one or more of the headings 8425 to 8480 is to be classified under the appropriate heading of the former group and not the latter.”

Heading 8515, in addition to soldering, brazing or welding machines includes “electric machines and apparatus for hot spraying of metals or cermets”. Heading 8468 does not include such “spraying” apparatus because of chapter 84, note 2. Heading 8424 includes mechanical appliances for projecting, dispersing or spraying liquids or powders. The Explanatory Notes to heading 8424 mention metal spraying pistols under the heading spray guns and similar appliances. (subheading 8424.20.90) Chapter 84, note 2 as indicated above would require classification under heading 8424 because heading 8424 is in the former group of headings.

Note 2 begins “subject to note 3 to section XVI”, which deals with composite or multifunction machines. If a machine of this type performed the non-electric hot spraying function of heading 8424 and, for example, oxyfuel welding of heading 8468, the principal function would have to be determined before applying chapter 84, note 2. If welding were the principal function, the spraying function would not be considered.

Chapter 85, note 6 indicates that “records, tapes and other media of heading 8523 or heading 8524 remain classified in those headings, whether or not they are entered with the apparatus for which they are intended.” Although this note appears in chapter 85, it also applies to chapters 84 and 90. This note deals primarily with software.

The Headings

Now that we have reviewed the legal notes and understand them fully, the classification of the machines should be simple. Right? Heading 8468 is non-electrical and heading 8515 is electrical.

Wrong! The invoice descriptions are often inadequate and industry terms can be less than illuminating, at least for tariff purposes.

Example: The invoice submitted to Customs reads "Stud Welder". Stud welding is a general term for joining a metal stud or similar part to a workpiece. It can be done by arc welding (subheading 8515.31), resistance welding (subheading 8515.21), friction welding (subheading 8468.80), etc.

Example: The invoice reads "Spot Welder". While most spot welders are resistance welders (subheading 8515.21), the function can also be performed by arc welding (subheading 8515.31) or other methods.

First let us deal with heading 8468. In the course of reviewing entries under the MARC 2000 program, it was discovered that MOST of the equipment entered under heading 8468 actually belonged in heading 8515 and some in other headings. This result is not that surprising since most of the welding equipment in use today is electrical.

Heading 8468

Heading 8468 provides as follows:

8468		Machinery and apparatus for soldering, brazing or welding, whether or not capable of cutting, other than those of heading 8515; gas-operated surface tempering machines and appliances; parts thereof:
8468.10.00	00	Hand-held blow torches
8468.20		Other gas-operated machinery and apparatus:
8468.20.10	00	Hand-directed or -controlled
8468.20.50	00	Other
8468.80		Other machinery and apparatus:
8468.80.10	00	Hand-directed or -controlled
8468.80.50	00	Other
8468.90		Parts:
8468.90.10	00	Of hand-directed or –controlled machinery and apparatus
8468.90.50	00	Other

As stated in the heading, apparatus other than those of heading 8515 fall within heading 8468. The Explanatory Notes to heading 8468 indicate that the heading excludes welding, brazing or soldering machines and apparatus using both gas and electricity.

In the section for gas operated appliances for working metal, etc., the heading 8468 EN's state that the appliances of this group are operated by means of a very hot flame produced by the combustion of an inflammable gas in a jet of oxygen or air. Further on the EN's state that ALL the appliances of this group have an arrangement for bringing two gases to the nozzle which has two outlets, either concentric or side by side; one of the gases is inflammable (acetylene, butane, propane etc.) and the other compressed air or oxygen.

Subheading 8468.10 provides for:

Hand-held blow torches – EN's to heading 8468 refer to "blowpipes" and describe them as high pressure or low pressure and indicate that both types are of similar construction. They consist of a handle or body fitted with the supply pipes, at the exit of which (the nozzle) the gas is ignited. They generally also include regulating valves. The apparatus is connected to an external gas supply by flexible tubing.

The description of blow torches in the EN's appears to describe an oxyfuel gas process. Oxyfuel gas welding is a term used to describe any welding process that uses a fuel gas combined with oxygen to produce a flame having sufficient energy to melt the base metal. The fuel gas (normally acetylene) and oxygen are mixed in the proper proportions in a chamber which is generally a part of the welding torch assembly.

Basic oxyfuel welding equipment consists of fuel gas and oxygen cylinders, each with a gas regulator, hoses for conveying the gases to the torch, and a torch and tip combination for adjusting the gas mixtures and producing the desired flame. A typical welding torch consists of a torch handle with control valves, mixer and tip assembly. In the mixer, the oxygen enters a center duct while the fuel gases enter angled ducts to effect the mixing. The welding tip is that portion of the torch through which the gases pass just prior to ignition and burning.

Subheading 8205.60 provides for blow torches and similar self-contained torches. The EN's to heading 8205 refer to "blow lamps" (e.g., for soldering or brazing; for paint removal; for starting diesel engines) of two types, both self-contained, differing in the type of fuel used, incorporating either a fuel reservoir for mineral oil or other liquid fuel or a replaceable gas cartridge. The heading does not cover gas operated welding appliances.

The major difference between the subheadings is that the blow torches of heading 8468 are connected to an external gas supply while those of heading 8205 are self-contained blow torches and those of heading 8468 must have the arrangement for bringing two gases to the nozzle.

Most of the blow torches of subheading 8468.10 are used in the jewelry industry. Some are also used in dental labs. (See NY ruling C87628 of 5/21/98) The blow torches of subheading 8205.60 may be marketed for soldering but many are promoted as multipurpose piezoelectric devices listing applications such as burning wood, lighting campfires, waxing skis, thawing frozen locks, sterilizing needles, as a portable torch, etc.

Subheading 8468.20 provides for:

other GAS operated machinery and apparatus (other than blow torches)

Thus the subheading covers gas operated machinery and apparatus other than blow torches. At the 8-digit level, the subheading identifies:

8468.20.10 - hand-directed or -controlled

8468.20.50 - other

The EN's to heading 8468 indicate that all hand-operated gas appliances of heading 8468 are connected to an external gas supply. Oxyfuel processes are primarily manual and most hand directed torches employing an oxyfuel process are the blow torches of subheading 8468.10. It does not appear that there should be much trade in subheading 8468.20.10.

The subheading also covers gas-operated surface tempering machines and appliances, which would fall under subheading 8468.20.50. The heading 8468 EN's indicate that these consist of a number of nozzles arranged according to the shape of the object to be treated. The flames from these nozzles project onto the surface to be tempered a heat of such intensity that it is rapidly brought to the temperature required, but this heat does not penetrate far below the surface. Once the surface has been brought to the required tempering temperature, sprays of cooling liquid are directed on the article or it is immersed in a bath of the liquid.

Subheading 8468.80 provides for:

other machinery and apparatus

Subheading 8468.80.10 - hand-directed or -controlled

Subheading 8468.80.50 - other

The main type of non-electric welders, other than the gas operated type of subheading 8468.10 and subheading 8468.20 include:

Friction Welding (FRW) – defined as “A solid-state welding process that produces a weld under compressive force contact of workpieces rotating or moving

relative to one another to produce heat and plastically displace material from the faying surfaces.”

Example - spin welder for thermoplastic pipe (NY ruling D84510 of November 19, 1998)

Diffusion Welding (DFW) - a solid state welding process that produces a weld by the application of pressure at elevated temperature with no macroscopic deformation or relative motion of the workpieces. A filler metal may be inserted between the faying surfaces.

Cold Welding - a solid state process in which pressure is used at room temperature to produce coalescence of metals with substantial deformation at the weld. A characteristic of the process is the absence of heat, either applied externally or generated by the welding process itself. (Cold welding is perhaps the only truly nonthermal welding process)

Subheading 8468.90

Subheading 8468.90.10 provides for parts of hand-directed or -controlled machinery and apparatus

examples: needles for blow torch (for micro-fine soldering)
 mixer for a welding torch

Subheading 8468.90.50 provides for other - parts of other than hand-directed.

Example: bases, frames, etc. for a welding machine

Heading 8515

Heading 8515 provides as follows:

8515 Electric (including electrically heated gas), laser or other light or photon beam, ultrasonic, electron beam, magnetic pulse or plasma arc soldering, brazing or welding machines and apparatus, whether or not capable of cutting; electric machines and apparatus for hot spraying of metals or cermets; parts thereof:

		Brazing or soldering machines and apparatus:
8515.11.00	00	Soldering irons and guns
8515.19.00	00	Other
		Machines and apparatus for resistance welding of metal:
8515.21.00	00	Fully or partly automatic
8515.29.00	00	Other

		Machines and apparatus for arc (including plasma arc) welding of metals:
8515.31.00	00	Fully or partly automatic
8515.39.00		Other
		Non-rotating type:
	20	AC transformer type
	40	Other
	60	Rotating type
8515.80.00		Other machines and apparatus
	40	Ultrasonic welding machines
	80	Other
8515.90		Parts:
		Of welding machines and apparatus:
8515.90.10	00	Of die attach apparatus, tape automated bonders and wire bonders for assembly of semiconductors of subheading 8515.80.
8515.90.30	00	Other
8515.90.40	00	Other parts

Subheading 8515.11 and 19 include Brazing or Soldering machines and apparatus

The Explanatory Notes to heading 8515 indicate that only machines and apparatus which by means of their special attachments (for example, a system of feeding in solder wire) are identifiable as solely or principally intended for brazing or soldering belong to this group and that the heading also covers electrically heated hand soldering irons and guns.

Subheading 8515.11 provides for:

Soldering irons and guns

The traditional soldering tool is the soldering iron with a copper tip. These tools are generally resistance heated. In fact, most soldering today is electrical. (As noted earlier, torch or gas soldering of heading 8468 is mainly limited to the jewelry industry and dental labs.)

The subheading also includes desoldering irons, which may or may not incorporate a pump to remove the melted solder.

Subheading 8515.19 provides for "other" (thus it covers soldering machines and apparatus other than soldering irons and guns as well as brazing machines and apparatus).

Examples of the equipment covered by this subheading include:

Soldering/Desoldering Stations including a soldering gun with a control unit (known as rework stations - see NY ruling 838921 of 4/13/89) for removing and replacing surface mount components from printed circuit boards (pcb's). It may also include a wire feeder.

In addition to soldering irons and guns, rework stations, etc. there is some specialized soldering equipment for the printed circuit board industry. This equipment includes:

Wave Solder Machines - automatic soldering systems used to attach through hole technology electrical components to their printed wiring board. The solder is pumped out of a narrow slot above the solder pot to produce a wave or a series of waves.

However, the following related equipment for pcb's is NOT classified under this subheading:

Solder Reflow Ovens - specialized ovens through which pcb's are automatically passed following component placement. Classification is under subheading 8514.30.

Hot Air Solder Levelers (HASL) - horizontal or vertical coaters used to apply molten solder to one or both sides of a pcb. Units include hot air blowoffs to level the solder. It is a coating, not a joining process, hence heading 8515 does not apply. Horizontal (spray) coaters (also known as curtain coaters) are classified in subheading 8424.89.7090; vertical (dipping - the pcb is dipped into a solder pot) coaters are classified in subheading 8479.89.9797.

Spray Fluxers - fluxing prepares the surfaces to be joined by cleaning the surface and protecting it from oxidation. Classification is under subheading 8424.89.7090. Note that some wave soldering machines incorporate a fluxing station. This is another example of a composite and multifunction machine. In this combination, wave soldering is the principal function hence classification is under subheading 8515.19.

Solder Paste Screen Printers - employ the same technology as any other screen printing machine. Classification is under subheading 8443.59.50.

Subheadings 8515.21 and 29 provide for:

machines and apparatus for resistance welding of metal

Subheading 8515.21 covers those which are fully or partly automatic

Subheading 8515.29 covers other than fully or partly automatic apparatus

In a fully automatic system, the workpiece is automatically fed, welded and ejected.

In a partly automatic setup, the operator positions the workpiece or welding gun and pushes a switch to initiate the weld.

A resistance welding machine has 3 principal elements:

(1) an electrical circuit consisting of a welding transformer and a secondary circuit with electrodes that conduct the current to the work

(2) a mechanical system consisting of a machine frame and associated mechanisms to hold the work and apply the welding force

(3) the control equipment to initiate and time the duration of current; it also may control the current magnitude as well as sequence and time of other parts of the welding cycle.

The most common resistance welding processes include:

Spot Welding (RSW) - most spot welders are of the resistance type. Produces coalescence at the faying surfaces of a joint by the heat obtained from resistance to the flow of welding current through the workpieces from electrodes that serve to concentrate the welding current and pressure at the weld area.

Projection Welding (PW) - produces coalescence of materials by the heat obtained from the resistance to the flow of the welding current. The resulting welds are localized at predetermined points by projections, embossments, or intersections.

Seam Welding (RSEW) - produces coalescence at the faying surfaces of overlapped parts progressively along a length of a joint.

Flash Welding (FW) - a resistance welding process that produces a weld at the faying surfaces of a butt joint by a flashing action and by the application of pressure after heating is substantially completed.

Upset Welding (UW) - a resistance welding process that produces coalescence over the entire area of faying surfaces, or progressively along a butt joint, by the heat obtained from the resistance to the flow of welding current through the area where those surfaces are in contact. Pressure is used to complete the weld.

Subheadings 8515.31 and 39 provide for:

machines and apparatus for arc (including plasma arc) welding of metals

Subheading 8515.31 covers those which are fully or partly automatic

Subheading 8515.39 covers other than fully or partly automatic apparatus

The statistical suffixes under subheading 8515.39 refer to the power source, however, the welding head or gun still must be included to be classified in this subheading.

	Non-rotating type
20	AC transformer type
40	other
60	Rotating type

There are two types of rotating machinery, generators which produce direct current and alternators which produce alternating current. Both have a rotating member called a rotor or armature and a stationary member called a stator.

The term **arc welding** applies to a large and diversified group of welding processes that use an electric arc as the source of heat to melt and join metals. The process may or may not require the use of filler metal. The welding arc is struck between the workpiece and the tip of an electrode. The electrode will either be a consumable wire or rod or a nonconsumable carbon or tungsten rod which carries the welding current. When a nonconsumable electrode is used, filler metal can be supplied by a spare rod or wire if needed. A consumable electrode, however, will be designed not only to conduct the current that sustains the arc but also to melt and supply filler metal to the joint.

In an automated setup, classified in subheading 8515.31, the equipment may include a controller, workpiece positioner and wire feeder, in addition to the welding machine or robot with welding attachments.

In a manual setup, classified in subheading 8515.39, the equipment generally consists of the torch or gun, welding cable and power supply, hoses and source of shielding gas. The torch may have auxiliary switches and valves built into the handle for controlling current and gas flow. The torch imported without the power supply or cable remains classified here as arc welding apparatus; it is not classified as parts.

There have been many instances where welding power supplies have been classified under subheading 8515.31 or subheading 8515.39 as arc welders or subheading 8515.90 as parts. As noted above, subheading 8515.39 includes a statistical breakout for AC transformer type arc welders. This may be causing some of the misclassifications. The EN's to heading 8515 indicate that separately imported welding generators are classified in HTSUS heading 8502 while transformers and inverters fall under heading 8504. The EN's to heading 8502 and heading 8504 refer these products to classification in heading 8515 if imported with their welding heads. (See also HQ ruling 956586 of October 4, 1994 which classified an inverter for a welding machine under subheading 8504.40.)

The most common arc welding processes include:

Shielded Metal Arc Welding (SMAW) - most widely used arc welding process in which coalescence of metals is produced by heat from an electric arc that is maintained between the tip of a covered electrode and the surface of the base metal in the joint being welded. The intense heat of the arc melts the tip of the electrode. In this manner, filler metal is deposited as the electrode is progressively consumed.

Submerged Arc Welding (SAW) - produces coalescence of metals by heating them with an arc between a bare metal electrode and the work. The arc and molten metal are “submerged “ in a blanket of granular fusible flux on the work.

Gas Metal Arc Welding (GMAW) - uses an arc between a continuous consumable filler metal electrode and the weld pool. May use a tubular electrode wherein metallic powders make up the bulk of the core materials (metal cored electrode). It has been the predominant choice for robotics.

Flux Cored Arc Welding (FCAW) - uses an arc between a continuous filler metal electrode and the weld pool. The flux cored electrode is a composite filler metal electrode consisting of a metal sheath and a core of various powdered materials.

Gas Tungsten Arc Welding (GTAW) - uses an arc between a non-consumable tungsten electrode and the weld pool. The electrode extends beyond the end of the shielding gas nozzle. The process is used with shielding gas and without the application of pressure and with or without filler metal.

Plasma Arc Welding (PAW) - produces coalescence of metals by heating them with a constricted arc between an electrode and the workpiece or between the electrode and the constricting nozzle. Pressure is not applied, and filler metal may or may not be added. The process uses a non-consumable electrode; the electrode is recessed and does not touch the workpiece. The PAW torch has a nozzle that creates a gas chamber surrounding the electrode. The arc heats the gas fed into the chamber to a temperature where it becomes ionized and conducts electricity. This ionized gas is defined as plasma.

Electro Gas Welding (EGW) - uses an arc between a continuous filler metal electrode and the weld pool, employing vertical position welding with backing to confine the molten weld metal. The process uses a consumable electrode, either solid or flux cored. The process is used with or without shielding gas and without the application of pressure.

Electro Slag Welding (ESW) - produces coalescence of metals with molten slag that melts the filler metal and the surfaces of the workpieces to be welded. The process is initiated by an arc that heats a granulated flux and melts it to form the slag.

Percussion Welding (PEW) - a joining process that produces coalescence with an arc resulting from a rapid discharge of electrical energy. Pressure is applied percussively during or immediately following the electrical discharge.

Subheading 8515.80 provides for:

“other” (other than soldering, brazing, resistance welding and arc welding)

Subheading 8515.80.0040 – “ultrasonic welding machines” - the parts to be joined are held together and subjected to ultrasonic vibrations.

Subheading 8515.80.0080 – “other” (which includes other welding processes such as laser or other light or photon beam, magnetic pulse, thermoplastic welding as well as the electric machines and apparatus for hot spraying of metals or cermets.)

Electron Beam Welding (EBW) - A fusion process that produces coalescence of materials with heat obtained by impinging a beam composed primarily of high energy electrons onto the joint to be welded. The heart of the process is the electron beam gun/column assembly.

Laser Beam Welding (LBW) - A fusion joining process that produces coalescence of materials with the heat obtained from a concentrated beam of coherent, monochromatic light impinging on the joint to be welded. It is a noncontact process, and thus requires that no pressure be applied. The most common types used are the YAG laser and the CO₂ laser. (**LASER** is an acronym for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation.)

One of the most common classification errors found in the past year was separately imported lasers classified under subheading 8515.80 as other electrical welding apparatus or under subheading 8515.90 as parts. Section XVI, note 1(m) excludes articles of chapter 90.

The Explanatory Notes to heading 9013 indicate that in addition to the lasing medium (e.g., the gas), the energy source (pumping system) and the resonant optical cavity (i.e., the basic elements combined in the laser head) lasers generally also incorporate a power supply, a cooling unit and a control unit. If these units are presented together, they remain in HTSUS subheading 9013.20. They are excluded from subheading 9013 if presented with work tables, work holders and means of feeding and positioning workpieces.

Thermal Spraying (THSP) is a process in which a metallic or nonmetallic material is heated and then propelled in atomized form onto a substrate. The material may be initially in the form of wire, rod or powder. It is heated to the plastic or molten state by an oxyfuel gas or an electric or plasma arc. Arc or plasma arc spraying apparatus is classified in subheading 8515.80. Oxyfuel gas spraying apparatus is classified in heading 8424.

The subheading also includes apparatus for assembly of semiconductors including die attach apparatus, tape automated bonders and wire bonders. As part of the Information Technology Agreement (ITA), new subheadings were created in July of 1997 for machinery used in the manufacture of semiconductor devices. The 1998 HTSUS contained a specific subheading, 8515.80.40, for this ITA equipment at a lower rate of duty than the non-ITA equipment of subheading 8515.80.80. When all of subheading 8515.80 became duty free in 1999, the specific ITA subheading was dropped however the equipment obviously remains classified in the current subheading 8515.80.00.

Die Attach Apparatus: there are two methods, eutectic (classified in subheading 8515.80.0080) and epoxy (classified in subheading 8479.89.8590).

The eutectic method is named for the phenomenon that takes place when two materials melt together at a much lower temperature than either one of them separately.

The epoxy method uses thick liquid epoxy adhesives; it is not a welding process.

Wire Bonding - A deformation welding process done with either gold or aluminum wires.

Gold Wire Bonding - there are two methods, thermocompression and thermosonic, also known as ball bonding. Thermosonic employs a pulse of ultrasonic energy.

Aluminum Wire Bonding - (no ball is formed) known variously as ultrasonic or wedge bonding.

Tape Automated Bonders - bond is complete with a tool known as a thermode.

Finally, two other processes (non-ITA) of significance under 8515.80 include fusion splicers and thermoplastic welders.

Fusion Splicers - for optical fiber cables - a DC high voltage arc generated from electrodes fuses the two optical fibers together. These self-contained portable units consist essentially of a fiber guide and clamp, fusion electrodes and electrode holders.

THERMOPLASTIC - the EN's describe machines and apparatus for welding thermoplastic materials.

1. Welding with electrically heated gas (hot gas welding) - the surfaces to be joined are warmed by electrically heated gas (generally air) and joined under pressure with or without additives.

2. Welding with electrically heated elements (heated element welding) - the surfaces to be joined are warmed by means of electrically heated elements and joined under pressure with or without additives.

3. High-frequency welding - the surfaces to be joined of thermoplastic materials (e.g., acrylics, polyethylene, vinyl, nylon) with reasonably high dielectric losses are heated in a high frequency alternating field and joined under pressure with or without additives.

Some examples of thermoplastic welders can be found in the following rulings:

NY 814525 of September 20, 1995 classified an automatic pocket maker (heat welding machine) used to make pockets, primarily out of polypropylene, for papers to be inserted in ring binders.

NY 885988 of June 1, 1993 classified hot air welding tools

HQ rulings 964783 of March 27, 2001 and 964638 of April 12, 2001 classified impulse bag sealers for commercial applications under 8515.80

Parts

Subheading 8515.90 - does not include accessories

Subheading 8515.90.10 - provides for parts of the ITA equipment noted above - die attach apparatus, tape automated bonders and wire bonders. The specific parts subheading was retained since parts of welding machinery and apparatus did not go duty free in 1999.

Subheading 8515.90.30 - provides for parts of welding machines other than the ITA equipment.

Subheading 8515.90.40 - provides for parts of soldering and brazing machines and apparatus and parts of electric machines and apparatus for hot spraying of metal.

The EN's to heading 8515 provide a few examples of parts:

soldering heads & tongs
electrode holders
metal contact electrodes (contact points, rollers & jaws)
torch points

What other items are classified as parts?

In general, electrical soldering, brazing or welding machine components such as beds, bases, columns, frames, rams, etc. will generally be classified as parts if imported separately.

Welding Jigs & Fixtures - in engineering, the terms “jig” and “fixture” have essentially the same meaning. The function of a fixture is to facilitate assembly of parts and to hold the parts in a fixed relationship.

Wire Feeders - used to add filler metal during automatic and machine welding. The feed may be through the torch or direct to the weld pool.

Thoriated Tungsten Electrodes (HQ ruling 957718 of April 5, 1995) - nonconsumable, does not melt, serves as one of the electrical terminals of the arc.

Ceramic Welding Nozzle for a TIG welding torch (NY ruling 892522 of December 8, 1993) - as noted earlier, ceramic articles are excluded from heading 8468 but not from heading 8515.

Not Parts

The heading 8515 EN's exclude: consumable electrodes of base metal - heading 8311 or articles of
Electrodes of graphite or other carbon, with or without metal (heading 8445)

Although many of the following items have already been mentioned throughout the preceding pages, they bear repeating under a discussion of parts since they are some of the most frequently misclassified items. The 4 digit headings and, where possible, the 6 or 8 digit subheadings follow the description.

- Welding transformers - heading 8504
- Welding generators - heading 8502
- Welding controls - subheading 8537.10
- Welding cables - heading 8544
- Welding helmets - classify according to constituent material
- Lasers - subheading 9013.20
- Nut feeders (HQ ruling 957460 of April 26, 1995) - heading 8479
- Positioning equipment (HQ 962105 of April 22, 1999) - heading 8479
 - headstock-tailstock type and tilting-rotating type.
- Fume extractor (NY ruling 878892 of October 21, 1992) -
 - subheading 8421.39 - eliminate fumes caused by arc welding.
- Desoldering pump (vacuum pump without any heating element) -
 - subheading 8414.10
- Solder paste - subheading 3810.10
- Solder paste flux - subheading 3810.90
- Solder wire or welding wire - if fluxed, subheading 8311

Solder or welding wire - if not fluxed - classify in the appropriate wire provision, e.g., other alloy steel welding wire would be in heading 7229

Measuring instruments related to welding, soldering etc. – various headings in chapter 90

Not Welding Machines and Apparatus under Heading 8468 or Heading 8515

The following are complete machines and apparatus, rather than parts, that have been misclassified as soldering, brazing or welding apparatus:

Wafer Bonders (subheading 8479.89.8590) - silicon is not a thermoplastic material. Wafer bonding is through atomic forces, not through a flow of material. It is not considered to be a welding process.

MicroTorches - multi-purpose, self-contained piezoelectric devices (subheading 8205.60)

Thermal cutting machines of the following types:

Oxyfuel - subheading 8461.90

Plasma Arc - subheading 8456.99

Laser Beam - subheading 8456.10

Veneer Welders - subheading 8465.94 (HQ ruling 089434 of September 16, 1991) - a machine for splicing/joining veneer strips

Solder Reflow Ovens - subheading 8514.30

Solder Levelling Machines - heading 8479 or heading 8424

Solder Paste Screen Printers - subheading 8443.59.50

Bag Sealers

- household type, subheading 8516.79 (HQ rulings 962013, 962015 and 962167, all dated October 1, 1999). These are hand-held devices.

However, impulse bag sealers of a type for commercial applications are classified under 8515.80 (see HQ ruling 964783 of March 27, 2001 and 964638 of April 12, 2001). They are generally bench top or floor standing units. (It should be noted that HQ ruling 964783 *revoked* HQ ruling 962014 of October 1, 1999 which had held that bag sealers of a type used in restaurants and supermarkets was classified under subheading 8543.89.96.)

Bag sealers incorporating vacuum pumps, conveyors or other mechanical features are classified in heading 8422.

Hot Air Guns – Subheading 8419.89.90. Hand held devices with a pistol grip which incorporate a self-contained electric motor which powers a fan that blows air over a ceramic heating element. They are used for various applications including stripping paint, soldering copper pipe, removing floor adhesives, window glazing, curing epoxies, shrink wrapping plastics, etc. See HQ rulings 960936 of January 29, 1998 and 962217 of April 9, 1999.

Desk Top Laminators - HQ ruling 959287 of October 21, 1996 - The laminator was classified in heading 8473. The ruling stated that because of its size and the environment in which used, it is not commonly regarded in the industry as a welding machine. Tariff terms do not include everything within their literal meaning.

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Additional Information

The U. S. Customs Service's home page on the Internet's World Wide Web, provides the trade community with current, relevant information regarding Customs operations and items of special interest. The site posts information -- which includes proposed regulations, news releases, Customs publications and notices, etc. -- that can be searched, read on-line, printed or downloaded to your personal computer. The web site was established as a trade-friendly mechanism to assist the importing and exporting community. The web site contains the most current electronic versions of, or links to:

- Customs Regulations and statutes
- Federal Register and public information notices
- The Customs Bulletin and Decisions
- Binding Rulings
- Publications including-
 - *Importing Into the U.S.*
 - other Informed Compliance Publications in the "*What Every Member of the Trade Community Should Know About:...*" series
 - *Customs Valuation Encyclopedia*
- Video Tape availability and ordering information
- Information for small businesses

The web site links to the home pages of many other agencies whose importing or exporting regulations Customs helps to enforce. The web site also links to the Customs Electronic Bulletin Board (CEBB), an older electronic system on which Customs notices and drafts were posted. Since December 1999, the CEBB has been only accessible through the web site. Finally, Customs web site contains a wealth of information of interest to a broader public than the trade community -- to international travelers, for example.

The Customs Service's web address is <http://www.customs.gov>.

The information provided in this publication is for general information purposes only. Recognizing that many complicated factors may be involved in customs issues, an importer may wish to obtain a ruling under Customs Regulations, 19 CFR Part 177, or obtain advice from an expert (such as a licensed customs broker, attorney or consultant) who specializes in Customs matters. Reliance solely on the general information in this pamphlet may not be considered reasonable care.

Additional information may also be obtained from Customs ports of entry. Please consult your telephone directory for a Customs office near you. The listing will usually be found under U.S. Government, Treasury Department.

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